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ABSTRACT

This report is concerned with an evaluation of a 2-week teaching trial in 1989 that utilized compressed data--interactive video technology. The trial was a collaborative venture of the University of New England (UNE), TELECOM, the Department of Education, Employment and Training (DEET), and SONY. In general, the University of New England supplied the educational resources, TELECOM the communications hardware, SONY the production equipment, and DEET the specific project and evaluation expenses. The trial was conducted between the UNE Armidale campus and the UNE Coffs Harbour campus, and involved the internal students enrolled at Coffs Harbour (38 students), UNE staff members (23 teachers), and some externally enrolled UNE students (17 students). Courses for internal students included economics, econometrics, accounting and financial management, principles of mathematics, and politics; courses for external students were psychology, English, geography, sociology, and history. Two-megabyte transmission was used in the first week and 384 kilobyte-transmission in the second week. All but one of the instructional sessions were transmitted from Armidale. Sessions were held in either a large lecture theater or a small conference room. Data were obtained using a series of Likert scale items and open-ended questions completed after each instructional session by the three groups. Data were analyzed using multivariate analysis of variance (MANOVA) to determine whether there was an overall difference in responses to a set of items when related to type and location of teaching sessions. The results, which are presented in three main sections, indicated general satisfaction with the physical presentation of the instruction and pacing of the material. Just over half of the internal students regarded the interactive video classes as fairly useful, while a quarter of them thought the classes were not very useful. Comments from the external students proved to be more positive, while teacher comments were quite varied. Appendices include a schedule of trial classes and the questionnaires used in the study. (DB)

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AN EVALUATION OF A TWO WEEK TEACHING TRIAL USING INTERACTIVE VIDEO TECHNOLOGY: PERCEPTIONS OF STUDENTS AND STAFF

R.A. Baker B.C. Hansford

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INTRODUCTION

BACKGROUND AND SIGNIFICANCE

This report is concerned with an evaluation of a two week teaching trial (October 2-13, 1989) that utilized compressed data, interactive video technology. This trial was a collaborative venture of the University of New England (UNE), TELECOM, the Department of Education, Employment and Training (DEET) and SONY. In general, the University of New England supplied the educational resources, TELECOM the communications hardware, SONY the production equipment and DEET the specific project and evaluation expenses.

The trial was conducted between the UNE Armidale campus and the UNE Coffs Harbour campus and involved the internal students enrolled at Coffs Harbour, UNE staff members who customarily have specific teaching responsibilities at Coffs Harbour and some externally enrolled UNE students.

In this trial, neither staff nor students received training or undertook an orientation program in the use of the technology. Consequently this can be appropriately termed a 'cold start' trial.

In the restructuring of the Australian tertiary sector the provision of services to increasingly networked and multi-campus institutions has become a reality. This restructuring also includes the identification of major Distance Education Centres with a responsibility for the provision of cost efficient courses. Consequently, the utilization and evaluation of emerging technologies in a trial such as outlined in this report appears to be particularly timely in the Australian context.

TRIAL CHARACTERISTICS

There were several aspects of this trial that constitute the basis for important comparisons involved in the evaluation. These relate to transmission mode, nature and location of instructional sessions, and type of respondents. Each of these will now be briefly outlined.

Transmission mode: Two megabyte transmission was used in the first week and 384 kilobyte transmission in the second week.

Nature and location of instructional sessions: All but one of the instructional sessions were transmitted from Armidale and these were in the form of either lectures or tutorials. Sessions were either held in a large lecture theatre (Belshaw) or a small conference room (Dean's Conference Room). The only exception to this was one lecture transmitted from Coffs Harbour to the Belshaw Lecture Theatre at Armidale.

Respondents: Data were obtained from three groups of respondents. These were internal students enrolled at Coffs Harbour, external students participating in evening sessions at Coffs Harbour, and UNE staff members, most of whom were involved in the normal teaching program at Coffs Harbour.

TRIAL SCHEDULE

Specific detail regarding location, times, dates and subjects taught are presented in Appendix A. It should be noted that some modifications were made to the appended schedule during the course of the trial. For example, the schedule indicates the presence of an audience (of a few internal students) in some Dean's Conference Room sessions. Implementation of this aspect of the trial was variable and hence the presence or absence of an audience in the Conference Room was not taken into account in this evaluation.

In general, the teaching program for internal students at Coffs Harbour was similar to that which would normally be offered through face-to-face teaching. The evening sessions for external students were set up specifically for the trial.

Lectures in Belshaw theatre were presented to internal Armidale students and were transmitted live to Coffs Harbour.

LIMITATIONS OF THE EVALUATION

There are several factors that may have limited the validity and reliability of the interactive video trial and which therefore place limitations on the evaluation itself. In particular, attention should be drawn to the following possible effects.

(i) The experimental nature of the trial may have created a 'halo' effect among participants.

(ii) The evaluation procedures themselves may have reinforced this 'halo' effect.

(iii) Given the nature, duration and context of this trial, it was not possible to adequately assess the 'learning' that may have been associated with the trial. In particular, measurable learning outcomes were not compared with those of traditional teaching techniques. In this evaluation the question of comparative learning was addressed by a single item based on respondents perceptions.

(iv) As the trial included various modes of presentation, a change in video transmission, different subject areas and a number of presenters, it was impossible to control for various plausible confounding variables and influences.

(v) There are concerns about the size and representativeness of the external student and staff samples.

METHODOLOGY

Sample: All internal students (n=38) from the Coffs Harbour campus, 17 external students and 23 UNE teaching staff formed the sample for this evaluation. The internal students were in their first year and enrolled in one or

more of the following subjects; Economics, Econometrics, Accounting and Financial Management, Principles of Mathematics, Politics. The external students represented those who lived in the Coffs Harbour area, could be contacted prior to the sessions, and were available to attend on the particular evenings. Nineteen of the teaching staff were involved in the regular Coffs Harbour teaching program.

Instruments: Three data collection instruments were developed for the evaluation of the video trial. These evaluation comment sheets were based on a series of Likert scale items and open ended questions. Each of the responding groups, namely, internal students, external students and teaching staff, required a somewhat different evaluation sheet and these are presented in Appendix B.

Data collection: After each instructional session, evaluation comment sheets were completed by internal and external students. A total of 278 comment sheets were obtained from internal students. On average, internal students filled out seven comment sheets. In addition, a final overall comment sheet was completed by 24 of the internal students. Seventeen external students filled comment sheets after their sessions. A total of 34 staff comment sheets were returned, and these had usually been completed on the day of the teaching session.

Data analysis: Data from the Likert scale items are presented in the form of percentages, means and standard deviations. An important issue for analysis in this evaluation was whether ratings given to items differed when factors such as the type and location of teaching sessions were taken into account. Consequently, multivariate analysis of variance [MANOVA] was used to determine whether there was an overall difference in responses to a set of items when related to such factors. When there was an overall difference, univariate F ratios were used to indicate which item or items contributed to this difference. When a univariate F ratio was significant, post hoc differences were determined using Newman Keul's multiple comparison test. This test identified whether the statistically significant differences in item responses were associated with, for example, lectures given in Belshaw theatre as against lectures given in the Dean's Conference Room, as against tutorials.

In this report, views and perceptions of the teaching trial are presented in three main sections: responses of internal Coffs Harbour students; responses of external students; responses of teaching staff. The report concludes with a summary of major findings.

RESPONSES OF INTERNAL STUDENTS TO THE TRIAL

This section of the report analyses reactions of internal Coffs Harbour students to the trial. Data are initially presented on students' ratings of physical presentation, instructional presentation and communication, and general assessments of sessions. Data from Week 1 and Week 2 are compared, and the possibility of a relationship between seating position and item responses is investigated. A summary of student responses to open-ended questions is then reported.

PHYSICAL PRESENTATION

Overall analysis

Students were asked to rate three aspects of physical presentation: quality of picture; quality of sound; view of the screen. Descriptive statistics indicating the percent of students responding in each of the five categories, along with means and standard deviations, are now presented.

Table 1

The quality of the picture was:					
	Excellent		Fair		Poor
	1	2	3	4	5
%	9.7	49.3	36.0	4.0	1.1
	n=278	mean=2.37	s.d.=.76		
The quality of the sound was:					
	Excellent		Fair		Poor
	1	2	3	4	5
%	11.2	43.2	30.9	11.9	2.9
	n=278	mean=2.52	s.d.=.76		
My view of the screen was:					
	Excellent		Fair		Poor
	1	2	3	4	5
%	21.6	41.4	27.3	7.2	2.5
	n=278	mean=2.28	s.d.=.96		

The above data indicate that the large majority of students were at least fairly satisfied with the quality of picture, quality of sound and view of the screen.

However, there is a need to establish whether there is a difference in responses associated with session format, that is, whether sessions were lectures given in the Belshaw lecture theatre, lectures given in the Dean's Conference Room, or tutorials (all of which were held in the Dean's Conference Room).

Responses analysed by session format

MANOVA, conducted on the data for the three items relating to physical presentation, indicate a significance difference existed (Wilks Lambda=.86, F=7.38, df=6,546, p=.00). The items associated with the multivariate difference can be identified by examining univariate F ratios (Table 2).

Table 2

	df	F	p
Picture	2,150	17.50	.00
Sound	2,150	.31	.74
View	2,150	9.09	.00

These data indicate that students perceive no significant difference in quality of sound associated with the three session formats. However, there are significant differences associated with the other two items, quality of picture and view of the screen.

Consequently, data on quality of picture and view of the screen need to be further examined to determine which session formats are associated with differing patterns of student response. A post-hoc test (Newman Keul's) was used to examine the three session format means associated with each of these two variables. Results of this test (p=.05) are reported in Table 3:

Table 3

Comparisons		Difference
Quality of picture,		
Lecture, Belshaw (2.73)	Lecture, Conf. Room (2.21)	Significant
Lecture, Belshaw (2.73)	Tutorial (2.14)	Significant
Lecture, Conf. Room (2.21)	Tutorial (2.14)	Not significant
View of screen,		
Lecture, Belshaw (2.56)	Lecture, Conf. Room (2.21)	Not Significant
Lecture, Belshaw (2.56)	Tutorial (1.81)	Significant
Lecture, Conf. Room (2.21)	Tutorial (1.81)	Not Significant

For both quality of picture and view of the screen, the students rated the Belshaw theatre as least favourable and tutorials as most favourable. With respect to quality of picture, lectures in Belshaw were perceived as being less favourable than both lectures and tutorials in the Conference Room. However, there is no significant difference between lectures and tutorials in the Conference Room. For the view of screen item, no difference was evidenced between lectures in either Belshaw or the Conference Room. A difference did exist between lectures in Belshaw and tutorials.

INSTRUCTIONAL PRESENTATION

Overall analysis

In this section the students answered two questions dealing with presentation of subject matter and two with instructional aids. These questions related to the speed (pacing) and clarity of presentation and the clarity and helpfulness of instructional aids.

Table 4

Presentation of the subject matter was:

	Too fast		About right		Too slow
	1	2	3	4	5
%	9.6	21.4	63.8	4.1	1.1
	n=271	mean=2.66	s.d.=.75		

	Very clear		Fairly clear		Not clear
	1	2	3	4	5
%	7.5	23.1	43.3	16.4	9.7
	n=268	mean=2.98	s.d.=1.04		

Instructional aids (for example, a whiteboard or overhead projector) were:

	Very clear		Fairly clear		Not clear
	1	2	3	4	5
%	7.9	24.0	31.5	14.6	22.0
	n=254	mean=3.19	s.d.=1.24		

	Very helpful		Fairly helpful		Not helpful
	1	2	3	4	5
%	11.0	26.4	32.3	15.7	14.6
	n=254	mean=2.96	s.d.=1.20		

As can be observed in Table 4 the majority of students (64%) perceived the pacing of subject matter to be 'about right'. Although 74% of students rated clarity of presentation as between 'very clear' and 'fairly clear', it should be noted that the remainder of the sample (26%) considered the presentation as being something less than 'fairly clear'.

With respect to instructional aids, while most students were satisfied with clarity and helpfulness, approximately one third of the students rated these criteria somewhat negatively.

Responses analysed by session format

An overall significant multivariate difference exists in the data relating to instructional presentation (Wilks Lambda=.62, F=15.93, df=8,475, p=.00). This overall difference will now be interpreted by examining the univariate F ratios.

Table 5

	df	F	p
Presentation:			
Speed (pacing)	2,150	1.50	.23
Clarity	2,150	50.67	.00
Aids:			
Clarity	2,150	44.36	.00
Helpful	2,150	51.48	.00

There is no significant difference relating to the pacing of material and the session format. However, significant difference does exist in the items concerning both clarity of presentation and instructional aids and the helpfulness of instructional aids. As a consequence the three session means for these items must be tested (Newman Keul's) to establish the location of this difference. These comparison tests are now reported.

Table 6

Comparisons		Difference
Clarity of presentation,		
Lecture, Belshaw (3.74)	Lecture, Conf. Room (2.54)	Significant
Lecture, Belshaw (3.74)	Tutorial (2.80)	Significant
Lecture, Conf. Room (2.54)	Tutorial (2.80)	Not significant
Clarity of instructional aids,		
Lecture, Belshaw (4.05)	Lecture, Conf. Room (2.68)	Significant
Lecture, Belshaw (4.05)	Tutorial (3.00)	Significant
Lecture, Conf. Room (2.68)	Tutorial (3.00)	Not Significant
Helpfulness of instructional aids,		
Lecture, Belshaw (3.88)	Lecture, Conf. Room (2.43)	Significant
Lecture, Belshaw (3.88)	Tutorial (2.57)	Significant
Lecture, Conf. Room (2.43)	Tutorial (2.57)	Not Significant

A consistent pattern is evident in the outcomes of the tests reported above. In terms of clarity of presentation, clarity of instructional aids and helpfulness of instructional aids the Belshaw lecture theatre receives the lowest ratings. The smaller conference room is assessed as being a significantly better setting with respect to these aspects of instructional presentation, a finding that is not altered by whether a tutorial or lecture was rated.

COMMUNICATION

Overall analysis

Two questions were asked with respect to specific aspects of communication during the interactive video teaching sessions. These questions were 'Was there sufficient opportunity for questions?' and 'Was there sufficient opportunity for discussion?' As the large lecture theatre (Belshaw) was considered an unlikely setting for considerable discussion and questioning to occur it was excluded from this section

of the analysis. Data regarding these two communication items are reported in Table 7.

Although the majority of students have responded to these questions on the positive end of the continuum there is a sizeable proportion of respondents that apparently would like a greater opportunity to be involved in the interactive aspects of the instructional sessions. For questioning, 16%, and for discussion, 22% of the sample wanted a greater opportunity to both ask questions and discuss the subject matter.

Table 7

Was there sufficient opportunity for questions?*

	Yes		Sometimes		No
	1	2	3	4	5
%	35.9	22.1	26.0	10.5	5.5
	n=181	mean=2.28	s.d.=1.21		

Was there sufficient opportunity for discussion?*

	Yes		Sometimes		No
	1	2	3	4	5
%	31.8	20.7	25.7	14.0	7.8
	n=179	mean=2.45	s.d.=1.28		

* Since opportunity for questions and discussion would not normally be expected in a large lecture delivered in Belshaw, data are reported only on lectures and tutorials delivered from the Deans Conference Room.

Responses analysed by session format

The MANOVA results indicate a significant difference in this data set (Wilks Lambda, F=6.49, df=2,176, p=.00). The univariate F ratios for the items dealing with questions and discussion are reported in Table 8.

Table 8

	df	F	p
Questions	1,150	12.88	.00
Discussion	1,150	10.09	.00

Both items are providing significant contributions to the multivariate difference and the origin of the difference must be established by testing the means associated with the two session formats, namely, tutorials or lectures in the small conference room.

Table 9

Comparisons		Difference
Sufficient opportunity for questions		
Lecture, Conf. Room (2.43)	Tutorial (1.64)	Significant
Sufficient opportunity for discussion		
Lecture, Conf. Room (2.60)	Tutorial (1.83)	Significant

As might be anticipated the students indicate greater opportunity for questions and discussion to occur in tutorial rather than lecture settings.

GENERAL ASSESSMENTS OF SESSIONS

Overall analysis

Three general questions were asked concerning whether students considered the sessions useful, if they were enjoyable and how they compared with the customary face-to-face teaching as a medium for learning. Descriptive statistics relating to these questions are reported (Table 10).

Table 10

In general, was this session useful?

	Definitely		Moderately		Not at all
	1	2	3	4	5
%	15.8	34.9	29.5	12.9	6.8
	n=278	mean=2.60	s.d.=1.11		

In general, was this session enjoyable?

	Definitely		Moderately		Not at all
	1	2	3	4	5
%	9.1	24.3	38.4	15.6	12.7
	n=276	mean=2.98	s.d.=1.13		

Compared to a normal face-to-face lecture or tutorial, how much do you think you learned from this session?

	More		About the same		Not as much
	1	2	3	4	5
%	1.1	2.5	52.9	21.4	22.1
	n=276	mean=3.61	s.d.=.89		

More than 80% of the students rated session usefulness as between 'moderately' and 'definitely' useful. In terms of enjoyable, slightly over 70% of the students placed their rating on the 'moderately' to 'definitely' continuum. Although approximately half of the students considered teaching by interactive video as 'about the same' as face-to-face teaching it is clear from the distribution of responses that many students viewed interactive video teaching as less effective than face-to-face in terms of potential learning.

Responses analysed by session format

The results of the MANOVA analysis indicate a significant multivariate difference in the data relating to the three items concerning the extent that this particular mode of teaching can be described as both useful and enjoyable, and as a comparative means of learning (Wilks Lambda, F=28.3, df=6,540, p=.00). The univariate F ratios for the three items included in the analysis are presented in Table 11.

Table 11

	df	F	p
Useful	2,150	48.88	.00
Enjoy	2,150	67.33	.00
Compared	2,150	38.97	.00

As each of the three items involved in the analysis have significant F values it is necessary to test the session format means associated with the items (Table 12).

Table 12

Comparisons		Difference
Were sessions useful?		
Lecture, Belshaw (2.60)	Lecture, Conf. Room (2.23)	Significant
Lecture, Belshaw (2.60)	Tutorial (2.08)	Significant
Lecture, Conf. Room (2.23)	Tutorial (2.08)	Not significant
Were sessions enjoyable?		
Lecture, Belshaw (3.89)	Lecture, Conf. Room (2.54)	Significant
Lecture, Belshaw (3.89)	Tutorial (2.46)	Significant
Lecture, Conf. Room (2.54)	Tutorial (2.46)	Not Significant
Compared to face-to-face?		
Lecture, Belshaw (4.19)	Lecture, Conf. Room (3.35)	Significant
Lecture, Belshaw (4.19)	Tutorial (3.14)	Significant
Lecture, Conf. Room (3.35)	Tutorial (3.14)	Not Significant

In terms of the extent to which students considered the sessions useful, enjoyable and as having a potential for learning the data analysis reveals consistent results. The large lecture theatre setting is seen as the least desirable of the session formats. Lectures and tutorials in the small conference room were again given the most positive ratings. In the case of each of the three items involved the mean scores were not significantly different for lectures and tutorials held in the conference room.

A final question in this section of the comment sheet was asked regarding 'the *general usefulness* of having classes which use interactive video.' The overall responses to this question are reported below.

Table 13

SO FAR, how do you feel about the *general usefulness* of having classes which use interactive video?*

	Very useful	Fairly useful	Not very useful	I'm not sure yet
%	5.2	56.2	24.5	14.1

n=249

* Differences between the beginning and end of the trial on this item are reported later in this section.

As can be observed a small percentage of the respondents rated the sessions as 'very useful'. Although over half perceived the sessions as 'fairly useful', nearly a quarter of the responses were in the 'not very useful' category and the remainder were 'not sure yet'. As the scale utilized for rating general usefulness could not be considered a continuous four point scale, it was necessary for purposes of statistical analysis to delete the category defined as 'I'm not sure yet'. An analysis of variance was conducted on the other three categories ($F=26.99$, $df=2,213$, $p=.00$). The results of Newman Keul's comparison test are reported in Table 14.

Table 14

Comparisons		Difference
General usefulness		
Lecture, Belshaw (2.61)	Lecture, Conf. Room (2.10)	Significant
Lecture, Belshaw (2.61)	Tutorial (1.97)	Significant
Lecture, Conf. Room (2.10)	Tutorial (1.97)	Not significant

Results shown in Table 14 are consistent with most analyses reported in this section on relationships between item responses and session formats. That is, lectures given in Belshaw theatre are rated significantly lower than either lectures or tutorials held in the Dean's Conference Room. As Table 14 shows, students are less likely to see interactive video teaching technology as 'generally useful' if used in the large lecture theatre.

PREDICTION OF STUDENTS' OVERALL ASSESSMENTS OF SESSIONS

Each of the rating scales within the Physical Presentation category and the Instructional Presentation and Communication category was concerned with input or process factors. Consequently, these factors can be regarded as possible predictors of responses to two of the items in the Overall Comments about the Session category. These items were concerned with whether sessions were useful and enjoyable.

Multiple regression analysis was used to investigate two questions:

1. To what extent do ratings on Physical Presentation and on Instructional Presentation and Communication predict student ratings on whether sessions were useful or enjoyable? This question is important because it gives an indication of the extent to which the rating scales used in this study incorporate appropriate and relevant criteria for an evaluation of the interactive video trial. For example, doubt would be cast on the value of the rating scales if it was found that they predicted very little about whether a session was found to be useful or not. Conversely, a substantial level of

prediction would imply that criteria measured through the rating scales are the most pertinent criteria for assessing overall reactions to sessions.

2. What is the relative contribution of Physical Presentation as against Instructional Presentation and Communication in predicting whether sessions were useful or enjoyable. In this evaluation, students were responding to factors directly concerned with interactive video technology (Physical Presentation) and were also responding to factors associated with any teaching and learning situation (Instructional Presentation and Communication). Consequently, it is important to assess the extent to which overall judgements on, for example, whether a session was perceived as useful can be accounted for primarily in terms of technology-related factors as against normal teaching and learning factors.

Hierarchical multiple regression analysis, involving two sets of variables, was used. The two sets of variables (Physical Presentation, Instructional Presentation and Communication) are used because the substantial inter-correlations among rating items within each set would give misleading regression weights if used as separate predictors in the analysis. Hierarchical analysis is appropriate for two reasons: Physical Presentation factors are logically prior to Instructional Presentation and Communication; the unique contribution to prediction of factors associated with Instructional Presentation and Communication can only be assessed after the contribution of Physical Presentation factors has been accounted for in the analysis.

The results of the regression analyses are shown in the Table 15. For each item ('useful' or 'enjoyable'), R^2 indicates the proportion of variance explained by a set, or sets, of predictor variables. Specifically, R^2 Total shows the variance explained jointly by Physical Presentation and Instructional Presentation and Communication. R^2 P.P. shows the variance explained by Physical Presentation alone, and R^2 I.P.C. shows variance explained by Instructional Presentation and Communication alone. (Because the item on pacing of presentation of subject matter does not form a scale, it was omitted from the analyses reported below.)

Table 15

In general, was this session useful?		
R^2 Total	R^2 P.P.	R^2 I.P.C.
.62	.24	.38
In general, was this session enjoyable?		
R^2 Total	R^2 P.P.	R^2 I.P.C.
.63	.22	.41

It is apparent from this table that the results of the regression analysis are similar for the two items concerning whether sessions were useful and enjoyable. In each case, it is notable that over 60% of the variance is explained by the predictor variables. This provides strong evidence that the rating scales within Physical Presentation and Instructional Presentation and Communication are appropriate and useful predictors of whether sessions were perceived as useful and enjoyable. The R^2 for the two sets of predictor variables shows that while a fairly substantial, and

statistically significant, proportion of variance is explained by Physical Presentation, almost twice as much is explained by Instructional Presentation and Communication.

Consequently, it can be argued that while student responses on whether sessions were useful or enjoyable were influenced by aspects of the technology, their responses were also strongly influenced by criteria which would be applicable in a face-to-face session. Since it is likely that the importance of Instructional Presentation and Communication factors is initially dependent on an acceptable level of Physical Presentation, the data suggest that Physical Presentation was sufficiently acceptable for students to feel able to assess sessions in terms of criteria which would apply to a normal face-to-face session.

RELATIONSHIP OF SEATING POSITION TO ITEM RATINGS

With the exception of some tutorials, seating at Coffs Harbour was in four rows. MANOVA was used to determine whether there was a difference in item ratings associated with a student's seating position. For analysis, seating position was classified into four sections within each row (left, left middle, right middle, right). Because of relatively small numbers, the two rear rows were combined.

The results of the MANOVA analysis indicate a significant multivariate difference (p=.04) for seating position. Examination of univariate F ratios indicate this difference is significant for only one item, 'View of the screen' (p=.01).

There are no significant differences *within* rows on ratings of view of the screen but there are substantial, and perhaps predictable, differences *among* rows. Mean ratings (with the two rear rows combined) are presented below:

Row 1: Mean=1.95
Row 2: Mean=2.21
Row 3: Mean=2.74

Notwithstanding the difference in row means, it is still the case that students rate view of the screen as better than 'Fair' irrespective of seating position. Consequently, it is perhaps not surprising that there is no significant relationship between seating position and other items on the comment sheet.

DIFFERENCES BETWEEN WEEK 1 AND WEEK 2

Transmission during the first week of the video trial was at 2 megabytes and 384 kilobytes in the second week. A comparison of the perceived quality of the picture across the two weeks is of particular importance since 384 kilobyte transmission is less expensive than 2 megabyte transmission.

MANOVA was used to determine whether there were significant differences on ratings given to items in Week 1 as against Week 2. While the overall MANOVA was statistically significant (Wilk's Lambda=.77, F=5.33, df=12,220, p=.00), examination of univariate F ratios showed that there is *effectively no difference* between Week 1 and Week 2 in student perceptions of the quality of picture.

Given this finding, coupled with the moderately positive overall student assessment of picture quality, data from this trial suggest that 384 kilobyte transmission is quite satisfactory.

The significant multivariate difference in this analysis was associated with the following items.

(i) 'Quality of sound' was rated significantly lower in Week 2 (p=.00).

(ii) Opportunities for questions (p=.03) and for discussion (p=.02) were rated more positively in Week 2 than in Week 1.

(iii) Week 2 data were more positive than Week 1 (p=.05) when students compared how much was learned compared with face-to-face sessions.

These differences would appear to be associated with the greater proportion of sessions conducted from the Dean's Conference Room in Week 2. This provided more opportunity for questions and discussion than in Week 1. At the same time, the increased interaction meant that difficulties associated with manual switching of sound levels across campuses (done in order to try to minimise echoing) became more marked. It may also be that the more negative comments about Week 2 partially reflect student frustration that there was no discernible improvement across the two week period.

ASPECTS OF SESSIONS WHICH WERE *PARTICULARLY GOOD* OR WHICH *SHOULD BE CHANGED OR IMPROVED*

The evaluation comment sheets contained an open-ended question on 'any one or two things about this interactive video session which you thought were *particularly good*' and a second question asking about 'things which *should be changed or improved*'. Principal response categories, and the number of times comments were made, are summarised below.

Aspects of sessions regarded as *particularly good*

Sixteen positive comments were made about lectures and tutorials delivered from the Dean's Conference Room. The main theme was that this setting conveyed a more personal feeling and style of interaction. Use of instructional aids, particularly overheads, in the Conference Room was noted as good in eleven comments. Generally, positive comments about the Conference Room were made by way of contrast with sessions from Belshaw theatre. Examples of student comments included:

> The small group instead of the lecture hall makes the information seem more face-to-face and thus come across clear. Small group with just lecturer more enjoyable.

> When the lecturer is only lecturing to the Coffs students it is almost as good as face-to-face. Don't like being taught in Belshaw theatre as lecturer doesn't seem to teach to us at all. We're not part of it.

Small group with just lecturer is definitely much better than being part of big, formal lecture.

The cameras were placed such that the lecturer appeared to be talking to us - more personal.

Talking to us as a group rather than presenting a lecture to a full theatre.

Some positive aspects of large lectures were identified (eight comments), for example, experiencing the 'reality' of the Armidale setting - 'The fact that you could see the lecturer and students all the way from Armidale live'.

Several comments noted each of the following as positive aspects of some sessions:

The opportunities for discussion in tutorials.

Sending overheads in advance to Coffs Harbour.

Opportunities to experience a range of lecturers and/or specialist lectures.

Lecturers who ask during sessions whether students can see and hear.

When the lecturer asked if we could see and if he could change overheads.

Aspects of sessions regarded as needing *change or improvement*

A total of 67 comments were made regarding the need for improvement in instructional aids. These comments were mainly directed towards the small size and lack of clarity of overheads. Legibility problems with blackboard writing were noted in 20 comments. A further difficulty arose from the fact that different colours on instructional aids were often not distinguishable, and this became a particular problem when lecturers or tutors used and referred to colour to illustrate specific points or sections of an instructional aid. It was also suggested (nine comments) that all overheads need to be sent to Coffs Harbour in advance and be shown there simultaneously with Armidale.

Forty-six comments asked for improvements relating to sound. These included a need to minimise echo, better synchronization of adjusting sound levels between sites, a different system of microphones to avoid passing them around. Student comments included:

Need more microphones - it was hard to keep up with the argument. Was also hard to break into conversations. By the time you had, forgotten what you wanted to say.

[When sound was turned down to minimise echo] Difficult to attract lecturer's attention - no two way interaction.

[In workshops] Mike should be left on, as when a query arises it needs to be answered immediately.

People are a bit shy to grab the mike when they want to ask questions.

A larger screen or monitor was suggested in sixteen comment sheets.

Various comments were made about the suitability of teaching styles for classes using interactive video. For example, ten comments argued that only some staff were suited to this mode of teaching. Reasons for these views were not generally stated, though some students referred to special needs in planning and preparation of instructional aids and a carefully paced and 'deliberate' presentation style. Sample comments included:

> It is becoming apparent that the system works reasonably well for lectures but it is tending to show up deficiencies of lecturers' styles and methods.
>
> Presentation of lecturers will have to be thought through by lecturer. This trial will definitely sort out lecturers who are better suited to this style of lecturing.
>
> The particular lecturer's presentation is about the same with video as with live. In my humble opinion it needs improvement.
>
> Lecturer uses transparencies well to convey message, i.e. if transparencies are available, the lecturer is a bonus.

Smaller numbers of comments on change and improvement were made in the following areas: cameras sometimes on staff member when should have been on overheads, and vice versa; seating arrangements need to be modified for different sessions; screen influenced by light glare; delays caused by technical faults.

STUDENTS' OVERALL COMMENTS ON THE TRIAL

At the end of the two week trial, students were asked to reflect back on all sessions and complete a final comment sheet on their overall reactions to, and appraisal of, the interactive video trial.

These overview data are presented below for the 24 students who were present to complete the final sessions. In the absence of the 14 students who had completed at least one previous comment sheet, the data are not necessarily representative of all the internal students. The 24 students completing the overview comment sheet had previously completed an average of nine comment sheets compared with seven completions for the sample as a whole.

In view of the relatively small sample, numbers rather than percentages of responses are reported in the tables in this section.

Table 16 shows responses to items concerned with physical presentation, and Table 17 reports responses to items relating to instructional presentation and communication.

Table 16

The quality of the picture was:

	Excellent		Fair		Poor
	1	2	3	4	5
n	1	12	10	1	0
	n=24	mean=2.45	s.d.=.67		

The quality of the sound was:

	Excellent		Fair		Poor
	1	2	3	4	5
n	0	8	13	1	2
	n=24	mean=2.88	s.d.=.85		

My view of the screen was:

	Excellent		Fair		Poor
	1	2	3	4	5
n	0	10	12	2	0
	n=24	mean=2.67	s.d.=.64		

The overall student assessment of picture, sound and view of the screen is fairly positive. In fact, few students rate these items as less than 'Fair'.

When compared with previous tables reporting aggregated session data, there is a tendency for overall ratings to be slightly more negative, and this is more marked for 'quality of sound' where the overall mean is .5 less than that previously reported. Nevertheless, it can reasonably be concluded from both sets of data that the physical presentation criteria are regarded by students as reasonably satisfactory.

Table 17

Presentation of the subject matter was:

	Too fast		About right		Too slow
	1	2	3	4	5
n	1	5	17	1	0

n=24 mean=2.75 s.d.=.61

	Very clear		Fairly clear		Not clear
	1	2	3	4	5
n	0	3	14	5	2

n=24 mean=3.25 s.d.=.79

Instructional aids (for example, a whiteboard or overhead projector) were:

	Very clear		Fairly clear		Not clear
	1	2	3	4	5
n	0	1	7	9	6

n=23 mean=3.89 s.d.=.87

	Very helpful		Fairly helpful		Not helpful
	1	2	3	4	5
n	1	2	13	3	4

n=23 mean=3.30 s.d.=1.02

Was there sufficient opportunity for questions?

	Yes		Sometimes		No
	1	2	3	4	5
n	1	1	13	5	4

n=24 mean=3.42 s.d.=.97

Was there sufficient opportunity for discussion?

	Yes		Sometimes		No
	1	2	3	4	5
n	1	1	12	8	2

n=24 mean=3.38 s.d.=.88

Based on an examination of mean scores, only one item, the pacing of presentation of subject matter, was rated on the positive side of 'Fair'.

Ratings of less than 'Fair' suggest that students were not satisfied with: clarity of presentation of subject matter; clarity or helpfulness of instructional aids; opportunities for questions or discussion. The clarity of instructional aids received a particularly low rating.

Each of the items in Table 17 was rated less positively than the aggregate rating from individual sessions, and this was most noticeable on opportunities for questions and discussion where means were lower by 1.14 and .93 respectively.

Table 18 contains student responses to the items concerned with general assessment of sessions.

Table 18

In general, were sessions useful?

	Definitely		Moderately		Not at all
	1	2	3	4	5
n	1	4	10	8	1
	n=24	mean=3.17	s.d.=.92		

In general, were sessions enjoyable?

	Definitely		Moderately		Not at all
	1	2	3	4	5
n	0	3	14	4	3
	n=24	mean=3.29	s.d.=.86		

Compared to normal face-to-face lectures or tutorials, how much do you think you learned?

	More		About the same		Not as much
	1	2	3	4	5
n	0	0	6	10	7
	n=23	mean=4.04	s.d.=.77		

SO FAR, how do you feel about the *general usefulness* of having classes which use interactive video?

	Very useful	Fairly useful	Not very useful	I'm not sure yet
n	1	13	6	0
n=20				

Overall, while more than half the students (15) rated sessions as 'moderately useful' or better, a substantial minority (nine students) regarded sessions less than moderately useful. A similar rating pattern is apparent with respect to whether sessions were enjoyable. There is of course no way of knowing how these students would rate a face-to-face session on these two criteria of 'enjoyable' and 'useful'.

The third item in this set asked for a comparative rating of sessions with face-to-face lectures or tutorials. About three quarters of the students felt they had learned less from sessions which used interactive video. No students felt they had learned more.

Regarding the general usefulness of interactive video sessions, a majority felt it was 'Fairly useful' while one third felt it was 'Not very useful'.

Each of the criteria in the Table 18 was rated more negatively when students give an overall assessment of the trial than when their responses to individual sessions are aggregated. As this pattern was also apparent in previous tables, it seems that students make more negative 'final judgements' about interactive video sessions than is reflected in attitudes based on immediate reactions to individual sessions.

Amplification of student opinions was obtained through responses to open-ended questions, and this is reported below.

Aspects of the trial which were *particularly good* or which *should be changed or improved.*

With respect to the location of sessions at Armidale, nine students said that lectures from Belshaw theatre had been unsatisfactory. Eleven students commented that the Dean's Conference Room was a more satisfactory location for lectures and tutorials. Comments included:

> The Belshaw lecture theatre video lectures were of little success as we couldn't see anything and it was as if we were an audience, not part of the lecture.
>
> The small groups such as Politics, or just the Coffs students with the lecturer on the monitor, worked out best and were the most enjoyable. In these sessions there was sufficient opportunity to discuss with the lecturer and ask questions.
>
> [Sessions were] good when the lecturer was one on one with a group at Coffs.
>
> I felt that the video lectures were more demanding and required substantially more concentration than face-to-face lectures.
>
> The tutorials are also not as good as face-to-face because if you turn to discuss something with another student you have to repeat it to the tutor, the tutor's not really part of the group.
>
> Eleven students commented on the need to improve the quality of overhead transparencies and/or the clarity of their transmission. Five students made similar comments with respect to use of the blackboard or whiteboard. Even when overheads had been sent to Coffs Harbour, 'The delay in putting up overheads at Coffs means one must write faster and therefore lose concentration and thread of what the lecturer is teaching'.

Difficulties associated with sound were noted by six students as an area requiring improvement. These difficulties included problems arising from manual adjustment of sound levels (intended to minimise echoing) which resulted in stilted interactions. Some students criticised the microphones, either because there were too few or because 'the microphones need to be less intimidating'.

Regarding possible uses of interactive video, several students mentioned each of the following points: interactive video has potential as a supplement to the normal teaching program; the system could be used to increase the range of course offerings after first year when classes would be smaller; video could be used for specialist lectures. Student comments included:

> Would be good for classes with small numbers of students where it would be impractical to transport a lecturer, thus giving students a wider choice of subjects.
>
> The system has potential. I think the ideal situation would be for the video link to be used in addition to face-to-face lectures, definitely not instead of. It's good for use in second, third year for wider subject choice.

This type of lecture/tutorials would be excellent in guest lectures but as a regular method of teaching it is not nearly as good as face-to-face.

The interactive video will be of great use to us if it can be used to give a greater range of subjects.

I think the video would be good if it was used as an addition to our normal face-to-face lectures and tutorials. I wouldn't like to see it used without the other.

Comments from one or two students included: larger monitors or a single large screen were needed; lecturers need training to use the technology; one monitor should show the overhead or blackboard while a second shows the lecturer or tutor; for small group sessions, seating patterns need to be adjusted. Two students commented that the trial 'was probably introduced to us at the wrong end of the semester as we are getting close to exams'.

RESPONSES OF EXTERNAL STUDENTS TO THE TRIAL

Five evening sessions were held for external students from the Coffs Harbour area in the following subject areas: Psychology; Geography; English; Sociology; History. These sessions were similar to a tutorial in purpose and format (though one included a short lecture). A copy of the comment sheet completed by students is included in Appendix B. Data from external students do, however, need to be interpreted with caution for the following reasons.

(i) Size of sample. A total of 18 students attended one or other of the five sessions and 17 completed the evaluation comment sheets. Only two of the five sessions approximated a realistic size for a tutorial group.

(ii) Representativeness of the sample. The small numbers are partly accounted for by late notification to students (sometimes on the day of the trial) and because residential schools in some of the subjects had been held within the previous two weeks. It is possible that those students who did attend were more highly motivated than a representative sample of students. Such a group might be more favourably predisposed towards the video trial (or any form of supplementary academic contact) than a broader cross section of students.

While these reservations about the size and representativeness of the data are serious, the strong positive consensus which emerges from student comments does need to be noted. To the extent that comments from this sample of external students can be considered a preliminary and exploratory appraisal of interactive video technology, there are clear indications that the technology is quite acceptable and that this mode of academic contact has merit and potential.

AN OVERVIEW OF EXTERNAL STUDENTS RESPONSES

Data reported in the panels below show that responses by external students to the video trial were very positive with respect both to the session attended as well as the potential for such technology. For example, *all* external students gave a rating of 'Very useful' when asked about 'the *potential usefulness* of interactive video technology for external studies programs'.

Because of the small sample size, an overall summary of responses, rather than a statistical breakdown, is now presented.

With respect to physical presentation:

The quality of the picture was judged to be good (mean=2.2, s.d.=.81).

The quality of sound was rated 'fair' (mean=3.1, s.d.=.33). As noted below and in other sections of this report, difficulties associated with minimising 'echo' generally resulted in the quality of sound being rated as less acceptable than other aspects of the technology.

View of the screen was regarded as close to 'excellent' (mean=1.2, s.d.=.56).

Regarding instructional presentation and communication:

The pacing of presentation of subject matter was judged 'about right' (mean=3.1, s.d.=.33).

Clarity of presentation was regarded as good (mean=2.1, s.d.=.80).

There was sufficient opportunity for questions (mean=1.1, s.d.=.24) and for discussion (mean=1.2, s.d.=.40).

[Items on clarity and helpfulness of instructional aids are nor reported since they were rarely used in sessions with external students.]

The potential usefulness of interactive video technology for external studies programs was rated 'Very useful' by every student in each of the sessions. [Other possible ratings were 'Fairly useful', 'Not very useful' or 'I'm not sure yet'.]

ASPECTS OF SESSIONS WHICH WERE *PARTICULARLY GOOD* OR WHICH *SHOULD BE CHANGED OR IMPROVED*.

Four open-ended questions were asked on the comment sheet. Responses were content analysed and a summary of themes is listed below along with the number of students who mentioned each theme.

(i) Things about this session which were regarded as *particularly good*.

Having personal contact normally only available in Armidale - nine students.

Scope for comment, discussion and questions - nine students.

Group feeling and interaction - seven students.

Life-like - three students

Potential for reducing costs for externals (travel and phone calls) - three students.

(ii) Things about this session which *should be changed or improved*.

The quality of sound, coupled with distractions from the moving of microphones and echoing of voices - twelve students.

Up to three students mentioned the following areas: need for more advance planning and notification; topics should be canvassed with students in advance; students should do preparatory work; session not long enough.

(iii) Responses to 'Apart from the purposes for which the technology was used tonight, are there other kinds of uses which you feel would be valuable? For example, do you think this technology might supplement or replace weekend schools and/or residential schools?'

> Could replace weekend schools - nine students.
> Could not replace weekend schools - two students.
>
> Could replace residential schools, but only if video sessions were held on a regular basis - three students.
> Could not replace residential schools - seven students.
>
> Supplement weekend or residential schools - six students.
>
> Videos of the sessions should be distributed to other students - two students.

(iv) Responses to, 'If you were to allocate priorities in how this interactive technology might be used, what do you consider should be the *major priority areas*?'

> Tutorial uses were nominated by most students who completed this question. As well as regular tutorials, specific suggestions included review and discussion sessions prior to essay submission and examinations.
>
> Two students suggested using the technology for delivery of lectures.
>
> A number of students used this question to reiterate opposition to using interactive video as a replacement for residential schools.

Taken overall, it is apparent that this sample of external students saw considerable potential in the use of interactive video technology. The technology was seen as quite satisfactory (excepting some difficulties with sound which apparently can be overcome using echo suppressors, as mentioned elsewhere in this report). The presentation of sessions and opportunities for communication were seen as very acceptable.

Consequently, data obtained from this small sample support an extension of interactive video technology for external teaching purposes.

At the same time it is apparent that a considerable number of this sample of external students held strong views that this technology *should not replace residential schools*. These views are illustrated in the following quotations taken from student comment sheets:

> The personal contact with other external students at weekend and residential schools would be lost which I feel would be a definite minus.

...could replace the weekend school and perhaps to a certain extent the residential school as well but the main drawback would be that the personal interaction with large numbers of students could not be achieved with this technology.

No. I think residential schools are an important part of External Study, as you feel a part of the university campus. You get to meet everyone in your course and gain a lot of moral support from them.

Having already met the lecturer at a residential school makes it easier to speak [using interactive video] than if it was to a total stranger.

I would be happy to attend these sessions to replace weekend schools. However, I don't know that they would be sufficient to replace a residential school in some subjects. Part of the benefit I have derived from residential schools is discussion with many other students doing the course. Plus the opportunity to thoroughly use the library.

RESPONSES OF TEACHING STAFF TO THE TRIAL

Twenty three staff members completed evaluation comment sheets (copy in Appendix B). As some staff were involved with more than one session, they completed two or more comment sheets. A total of 34 comment sheets were completed.

STAFF RATINGS OF ITEMS

The first section of the comment sheet asked staff to indicate, on the six items below, how satisfied they were with aspects of the trial.

Table 19

The quality of the picture from Coffs Harbour?

	Very satisfied		Fairly satisfied		Not satisfied
	1	2	3	4	5
%	12.5	21.9	46.9	15.6	3.1
	n=32	mean=2.75	s.d.=.98		

The quality of the sound?

	Very satisfied		Fairly satisfied		Not satisfied
	1	2	3	4	5
%	6.9	20.7	41.4	24.1	6.9
	n=29	mean=3.03	s.d.=1.02		

Using instructional aids (overhead, whiteboard)?

	Very satisfied		Fairly satisfied		Not satisfied
	1	2	3	4	5
%	5.3	36.8	31.6	0.0	26.3
	n=19	mean=3.05	s.d.=1.3		

The possibility for students to comment or ask questions?*

	Very satisfied		Fairly satisfied		Not satisfied
	1	2	3	4	5
%	16.0	20.0	36.0	20.0	8.0
	n=25	mean=2.84	s.d.=1.18		

* excludes data for lectures given in Belshaw Lecture Theatre.

The pacing of the session?

	Very satisfied		Fairly satisfied		Not satisfied
	1	2	3	4	5
%	19.2	34.6	19.2	19.2	7.7
	n=26	mean=2.62	s.d.=1.24		

Your level of personal comfort?

	Very satisfied		Fairly satisfied		Not satisfied
	1	2	3	4	5
%	9.4	31.3	50.0	9.4	0.0
	n=32	mean=2.59	s.d.=.80		

The means reported in the above table indicate that staff were 'Fairly Satisfied' with those aspects of the trial included on the rating scales. However, it is also apparent from the standard deviations that there was considerable variation in staff responses and that this variation is masked by examination of means alone.

Further analysis was carried out to investigate three factors which may have been associated with this variation: subject being taught; session format (that is, location and lecture or tutorial); whether classes were held with internal or external students. There was *no significant relationship* between item responses and subject area (coded as Economics/Other because of the small sample size) or between items and session format or between item responses and whether classes were internal or external.

On balance, staff rating data need to be treated cautiously. While a statistically forced consensus (mean data) suggests a reasonable level of staff satisfaction with items, the considerable variation in responses indicates that staff reactions are rather diverse. Further analysis of data has not identified factors that are systematically associated with this diversity.

More extensive, qualitative staff data are provided by responses to several open-ended questions. Staff comments are summarised below.

COMPARED WITH A NORMAL FACE-TO-FACE SESSION, HOW EFFECTIVE DO YOU FEEL THIS SESSION HAS BEEN?

No staff member said the session was *more effective*.

Ten staff said the session was *about as effective* as a normal face-to-face session.

Thirteen staff said the session was *less effective*.

In general terms, staff members who regarded sessions as less effective indicated that it was difficult to pick up nonverbal cues such as facial expressions and making eye contact. Such cues would normally help in assessing student reaction and understanding, thereby affecting the flow and pace of a class. Comments included:

> I was considerably less able to gauge students' reactions to my lecture. This made it difficult to decide which points required further clarification.
>
> I had to constantly try to watch their faces to see if I was going too fast. I asked them to wave to slow me down!
>
> Lack of non-verbal interaction sorely missed. Students may or may not have listened to what I was saying - I couldn't tell.
>
> Without being able to focus the camera on any questioner, or use some other means of identification, the interactive part lost most of its 'personality'.
>
> I think the camera on the Coffs group was too far away from them, it could

been closer giving a greater sense of face-to-face.

Additional comments concerning the comparison with face-to-face classes related to psychological distance.

> I felt I was looking through a small window to the students in the next room. While it is possible to communicate, the situation does not engender a free flow, particularly if I myself am at some distance from that window. At the student end, the camera angle made the students look small (and as if I was looking down on them). Eye level cameras would help.
>
> Moreover, I had no real sense of being part of a group which is essential if tutorials are going to work.

MODIFICATIONS TO PREPARATION AND DELIVERY.

Most staff stated they had made minor or no modifications to their teaching, although some felt that their presentation had been slower than normal, particularly in sessions using instructional aids and those requiring interaction.

It should be noted that a number of staff said they had not made modifications because they were entering the trial 'cold' and were unsure what modifications may have been needed. Fairly substantial modifications were made, however, by several staff who taught more than one session (or who were briefed in advance by colleagues). These staff identified preparation and use of instructional aids as the principal area in which modifications were made. Such comments were presented most strongly by staff whose teaching was of sequential material relying on a progression of overheads. For example,

> Very great modifications needed. It was not possible to teach this material as I would to internals. All my overheads had to be done differently ... must use large overheads and size of writing.
>
> I feel that this technology is suitable for courses with limited numbers of students and in courses where only limited use of the blackboard is needed. It appears that the technology is not suitable where a lot of algebraic derivations are involved.

STAFF COMMENTS ON FACTORS WHICH INFLUENCED SESSION EFFECTIVENESS.

A summary of staff comments is reported below along with the number of staff who noted each of the comment areas.

> Eleven staff criticised aspects of sound transmission. In particular, staff noted that echoing of one's own voice was distracting. Manual adjustment of sound levels to minimise echoing, it was suggested, meant that dialogue became stilted. At times, the first part of sentences was cut off, while sometimes it was not noticed that someone from the other campus was trying to speak.

Four staff suggested that more microphones, and/or different types, were needed to avoid problems associated with sound quality and the artificiality of having to move microphones around or move to microphones.

Eleven staff noted problems with instructional aids. Overhead transparencies, and blackboard writing, needed to be larger than usual. The colour on overheads was not normally discernible at Coffs Harbour and this created difficulties when colour coding carried substantive meaning. Early in the trial, and after initial problems with legibility of overheads, some staff sent overheads by FAX to Coffs Harbour. These were shown on a projector while also displayed on the (much smaller) monitor. Generally, this procedure worked well although it required extra assistance at Coffs Harbour. Some staff, as well as students, suggested that the overheads be photocopied as handouts to be distributed to Coffs students.

Limitations on the range of lecturer/tutor movement, particularly when using the blackboard, were cited by six staff members.

Arrangements in the Dean's Conference Room were criticised by eleven staff. Principal reasons were: cumbersome arrangement of furniture; presence and movement of observers; both the room and overhead became too hot.

The following points were made by a smaller number of staff:

Where students may not be known to staff (for example, a tutorial in a large external course), a seating plan should be provided, or large name tags used.

Some staff would have preferred a larger monitor in the Dean's Conference Room.

Three staff stated they felt uncomfortable with the Coffs camera angle which made them feel they were looking down on students.

Although the picture from Coffs Harbour was wide angle, students at the ends of the front rows were not visible.

STAFF SUGGESTIONS REGARDING POSSIBLE ORIENTATION OR TRAINING PROGRAMS.

Eighteen staff members wrote comments in support of a training or orientation program. Principal areas noted were: advice on timing, presentation style and modes of delivery; assistance with the preparation of appropriate instructional aids; advice on facilitating group interaction among students; orientation designed to help overcome nervousness; some introduction to technical aspects of equipment. Specific comments included:

More overall care in presentation will be needed, good visuals, clear enunciation, talking to the camera/monitor, not out of the window!

Staff should be given video cassettes of their lectures in order to help them improve their presentation. Lecturers very rarely see or hear themselves.

[Need to know] how to cope with students in a 'box' - i.e. there is a tendency to lecture in a tutorial.

[Need to] develop strategies for more group interaction between students.

Training is essential. It would be good to have staff at both ends (e.g. a staff seminar), without students, to gain experience. Also, it would be helpful to have staff trained in zooming cameras, switching the board, etc. in order to avoid having to bring in extra staff (and thereby increase cost). We also need instruction in the use of slides and guidance on the design of overheads. A dedicated studio is also needed. Note, too, that students really need to be trained to get the most out of this technology.

However, training or orientation programs were not uniformly endorsed:

I believe that the 'normal' teaching sessions should be filmed - that way no pressure is placed upon staff to train at all. There are too many competing interests on our time as it is.

I fail to see why staff need to be trained or orientated unless staff (or should I say 'human resources') have to operate the equipment themselves.

STAFF COMMENTS ABOUT FUTURE PROCEDURES OR CHANGES IF INTERACTIVE VIDEO TECHNOLOGY WERE TO BE MORE WIDELY USED BY THE UNIVERSITY.

Staff comments on this final question overlapped to some extent with earlier comments. Some additional concerns or suggestions are listed below:

A fairly small number of staff argued that the technology was appropriate for lectures but not for tutorials, and a similar number argued for tutorials and against lectures. These views did not appear to be associated with a particular subject area.

Four staff questioned the cost effectiveness of the technology:

> It is obviously too costly to be used by external students in relatively isolated areas. Its scope is probably limited to 'off campus' internals in centres like Coffs Harbour. But, even here, we see it as a supplement to having staff on the ground.

Several staff argued that interactive video technology could not and must not replace Residential Schools. Generally these staff saw the technology as a potentially useful supplement to existing programs but not as a replacement for face-to-face contact or the experience of spending time on the Armidale campus.

> I would like to see the interactive video used as a <u>supplement</u>, not as a <u>replacement</u>, for tutorial sessions where a need can be shown to highlight its advantages, <u>not</u> because the technology has evolved.
>
> Video is only a second best thing. It should not replace face-to-face.

> I hope it is never more than incidental to teaching methods.
>
> On balance, we do not feel that the technology could replace our Residential Schools. Nor do we feel that it provides a cost-effective alternative to weekend schools. ..... Finally (and very importantly) we would not want to see UNE get besotted with this new technology to the extent that resources were diverted from other issues such as, (i) improving the quality of presentation of external notes, (ii) increased use of radio, (iii) preparation of videos.

Other comments and suggestions included:

Establishing a dedicated teaching station and/or studio (three staff).

Ensure that students are not only informed of sessions sufficiently in advance but also that they are informed of preparation to be done for the session (four staff).

As implied in some earlier comments, several staff expressed concern about the extra workload, particularly in preparation, required to teach in this mode.

Five staff asked that sessions be videotaped for later playback and analysis in order to better understand the medium and to improve delivery.

SUMMARY

This evaluation report has presented data on the views and perceptions of internal Coffs Harbour students (n=38), external students (n=17), and teaching staff (n=23), in relation to a two week interactive video teaching trial. A summary of major findings is presented below.

INTERNAL STUDENTS.

Data from the 278 comment sheets completed by internal students show that:

(i) Most students expressed general satisfaction with physical presentation, that is, quality of picture, quality of sound, view of the screen.

(ii) Regarding instructional presentation, most students considered the pacing of presentation of subject matter to be 'about right'. Overall, clarity of presentation was rated 'fair', and instructional aids were rated 'fairly clear' and 'fairly helpful'.

(iii) Opportunity for questions and discussion was, in the aggregate, regarded as adequate.

(iv) Asked for their general assessment of sessions, most students saw them as quite useful and moderately enjoyable. Compared with a 'normal face-to-face lecture or tutorial', about half the students felt they had learned about as much from interactive video sessions, while over 40% felt they had learned less. Regarding 'the *general usefulness* of having classes which use interactive video', just over half of the students thought such classes were 'fairly useful', a quarter thought classes were 'not very useful', and a smaller proportion were unsure.

The above aggregated findings do, however, mask the considerable variation in student responses depending upon whether sessions were lectures in Belshaw theatre, lectures in the Dean's Conference Room, or tutorials (all which were held in the Dean's Conference Room). Results of analyses taking these session formats into account showed a consistent pattern:

(i) Sessions from Belshaw theatre were rated significantly less positively than lectures and tutorials given from the Dean's Conference Room on all rating criteria except quality of sound and, for lectures in the Conference Room, view of the screen.

(ii) Consequently, ratings of sessions delivered from the Dean's Conference Room are almost always more positive than those reported in the aggregate data summary above. There is a general tendency for tutorials to be rated more positively than Dean's Conference Room lectures but this difference is statistically significant only for the items on opportunities for questions and for discussion.

The table below summarises the pattern of item ratings for each of the session formats. An item whose mean is more than .2 above the midpoint of each rating scale

is categorised 'Acceptable', and more than .2 below the midpoint is categorised 'Less than acceptable'. Means within .2 of the midpoint are categorised as 'Marginal'. This summary table is necessarily somewhat oversimplistic. More complete data are presented in the body of the report.

Table 20

Item	Lecture Belshaw	Lecture Dean's C.C.	Tutorial
Quality of picture	Acceptable	Acceptable	Acceptable
Quality of sound	Acceptable	Acceptable	Acceptable
View of the screen	Acceptable	Acceptable	Acceptable
Pacing of presentation*	Acceptable	Acceptable	Acceptable
Clarity of presentation	Less than acceptable	Acceptable	Marginal
Clarity of aids	Less than acceptable	Acceptable	Marginal
Helpfulness of aids	Less than acceptable	Acceptable	Acceptable
Opportunity for questions	N/A	Acceptable	Acceptable
Opportunity for discussion	N/A	Acceptable	Acceptable
Usefulness of session	Acceptable	Acceptable	Acceptable
Enjoyability of session	Less than acceptable	Acceptable	Acceptable
Compared to face-to-face	Less than acceptable	Less than acceptable	Marginal
General usefulness	Less than acceptable	Marginal	Marginal

*For this item, all means are within .2 of the midpoint, 'About right'.

It was possible that a student's seating position at Coffs Harbour may have affected responses to item ratings. Ratings for only one item were significantly associated with seating position. This item, not surprisingly, was 'View of the screen' which was progressively rated more negatively the further a student sat from the monitors. Even so, students gave at least a 'fair' rating to view of the screen irrespective of their seating position.

Comparison of data between Week 1 and Week 2 showed no difference in ratings of the quality of the picture. Hence there is no evidence of a perceived difference between 2 megabyte (Week 1) and 384 kilobyte (Week 2) transmission.

The Week 1/Week 2 comparison did reveal significant differences on three items: quality of sound was rated more negatively in Week 2; opportunities for questions and discussion were rated more positively in Week 2. These differences appear to be associated with the increased proportion of sessions from the Dean's Conference Room in Week 2. These sessions offered more opportunity for interaction, however the manual adjustment of sound levels (in order to minimise echo) created some difficulties for the flow of interaction.

Consistent with data reported above, student responses to open-ended questions expressed a preference for sessions from the Dean's Conference Room. This setting was seen as more personal and interactive, and was also associated with more effective use of instructional aids.

With respect to student comments on areas needing change and improvement, many students identified a need for improved instructional aids (for example, improved clarity and legibility, sending aids such as overheads to Coffs Harbour in advance). A substantial number of students requested improvements to sound

(primarily relating to minimising echo, synchronizing sound, and a better microphone system).

Most internal students also completed a final overall comment sheet on the two week trial. Students made more negative 'final judgements' about interactive video sessions than was reflected in responses based upon immediate reactions to individual sessions. A summary of students' end-of-trial overall comments, based on the same criteria used in Table 20, shows: quality of picture and view of the screen were 'acceptable' while sound was rated 'marginal'; pacing of presentation of subject matter was 'acceptable' while clarity of presentation was rated 'unacceptable'; clarity and helpfulness of instructional aids were 'unacceptable'; opportunities for questions and discussion were 'unacceptable'; usefulness of sessions was 'marginal' while enjoyment of sessions was 'unacceptable'; comparison with face-to-face classes was 'unacceptable', as was the rating given on the general usefulness of classes using interactive video.

The more negative overall ratings noted in the previous paragraph need to be balanced by the finding already reported that student reactions to the trial differ quite markedly depending upon, for example, the nature and location of a session. In their overview comments on the trial some students did suggest that interactive video has potential as a supplement to the normal teaching program and for specialist lectures, and also endorsed use of the system to increase the range of course offerings after first year when classes would be smaller.

EXTERNAL STUDENTS

Comments on the video trial from external students were generally very positive. Some care must be taken in generalising from these comments because of sample size and representativeness concerns outlined in the body of this report.

Perhaps the most striking finding from the external student evaluations is that every student (n=17) in the five evening sessions gave the highest rating of 'Very useful' when asked about 'the *potential usefulness* of interactive video technology for external studies programs'.

For physical presentation, students regarded quality of picture as good and view of the screen as very good. Quality of sound was 'fair'.

Pacing of presentation of subject matter was judged 'about right' and clarity of presentation was quite satisfactory. Very positive ratings were given to opportunities for questions and discussion.

In response to open-ended questions, frequently mentioned strengths of interactive video were: having personal contact normally available only in Armidale; scope for comment, discussion and questions; group feeling and interaction.

Improvement or change suggestions focussed mainly upon the quality of sound. As with other participants in the trial, external students noted problems associated with manual switching of sound levels to minimise echo and distractions and delays associated with microphones.

An open-ended question asked about possible use of interactive video to supplement or replace weekend or residential schools. A moderately large number of students thought the technology could replace weekend schools (and a smaller number did not). However, there was little support for replacing residential schools, and it was apparent that most students held strong views that residential schools should be retained. Suggested uses for interactive video included tutorials and review and discussion sessions prior to essay submission and examinations.

Taken overall, data from this sample of external students suggest considerable potential for the use of interactive video in external study programs. Responses are noticeably more positive than from internal students, although this could perhaps be expected since internals are comparing interactive video with face-to-face classes whereas, for externals, interactive video is an addition to their normal program.

TEACHING STAFF

Staff responses to the trial were quite varied, and this variation did not seem to be associated with factors such as teaching subject, session format, or whether students were internal or external.

On average, staff were 'Fairly satisfied' with quality of picture, quality of sound, using instructional aids, opportunities for questions and discussions, pacing of the session, and level of personal comfort.

Just over half the staff members felt that sessions were less effective than a face-to-face class. In general terms, staff members who regarded sessions as less effective indicated that it was difficult to pick up nonverbal cues such as facial expressions and making eye contact. Such cues would normally help in assessing student reaction and understanding, thereby affecting the flow and pace of a class.

Suggested areas of change and improvement were mainly concerned with quality of sound and instructional aids. Regarding sound, it was noted that manual adjustment of sound levels to minimise echoing meant that dialogue sometimes became stilted. Concerns with instructional aids were often linked with comments on training and orientation needs.

Most staff supported training or orientation programs if interactive video were to be adopted in the future. It was suggested such programs would need to focus on advice on timing, presentation style and modes of delivery; assistance with the preparation of appropriate instructional aids; advice on facilitating group interaction among students; orientation designed to help overcome nervousness; some introduction to technical aspects of equipment.

Taken overall, staff views on use of interactive video technology are varied. A small number of staff, for example, argued against use of the technology. While some staff saw potential for interactive video, this was generally as a supplement rather than as a replacement for current teaching practices and procedures. Several staff expressed strong concern at any possibility that interactive video technology might replace residential schools.

CONCLUDING COMMENT

Based on the data presented in this report, it seems reasonable to make the following concluding observations.

For internal students, it is apparent that the technology is not equally effective over different teaching and learning situations. Interactive video technology is differentially received depending upon the teaching mode. If this were not taken into account, the potential of the technology could be jeopardised.

External students expressed satisfaction with their experience of interactive video. They also saw considerable potential for use of the technology. In view of this reaction, and possible implications for distance education, interactive video seems worthy of further exploration.

Staff reactions are quite varied, and in some respects guarded. There is a need for an academic rationale which would indicate how interactive video could be articulated into the overall teaching program. It is also apparent that this technology introduces new and additional demands upon staff, and this would need to be explicitly taken into account should an interactive video program be implemented.

There are various improvements which can be made to the technology used in this trial. For example, echo suppressors would alleviate some of the problems with quality of sound. However, it is important to note that the effectiveness of this interactive video trial was associated as much with aspects of instructional presentation and communication as with the technology itself.

APPENDIX A

INTERACTIVE VIDEO USING COMPRESSED DATA TECHNIQUES TRIAL SCHEDULE

OCTOBER	2nd Monday	3rd Tuesday	4th Wednesday	5th Thursday	6th Friday	7th Saturday	8th Sunday	9th Monday	10th Tuesday	11th Wednesday	12th Thursday	13th Friday
		8.30am START										
9:00-10:00am		Ian Eddie L (B) AFM	Ian Eddie L (B) AFM		Joan Cleary L (C)a MS & CS			Joan Cleary L (C)a MS & CS				Joan Cleary T (C)a MS & CS
10:00-11:00am		Chris Alaouze L (B) Econometrics	Chris Alaouze L (B) Econometrics	David Wells L (C)a Politics	Prasada Rao L (C)a Econometrics				Joan Cleary L (C)a MS & CS		David Wells L (C)a Politics	
11:00-12:00pm			Mohammed Taslim L (B) Economics	Graham Maddox L (C)a Politics	Anthony Ashbolt T (C)a Politics			Mohammed Taslim L (B) Economics	Joan Cleary L (C)a MS & CS	Jim Williams T (C) Economics	Graham Maddox L (C)a Politics	
12:00- 1:00pm				DB	Ian Eddie demo L to (B) from Coffs Harbour				Prasada Rao L (C)a Econometrics		DCE Jenny Rusey	David Hartley T (C)a Politics
1:00- 2:00pm								Charles Sturt University				Jill Phillips NR Campus Di Adams
2:00- 3:00pm		DCE Geoff Arger	1:45 SidMorris CH - T IBM Bro R. Powell		Joan Cleary L (C)a MS & CS	CONT ED Nursing		Ian Falconer T (C) Project team & students	Di Dancer T (C) Econometrics			
3:00- 4:00pm		DB	Ian Eddie T (C)a AFM		Joan Cleary T (C)a MS & CS				Di Dancer T (C) Econometrics			
4:00- 5:00pm			Brian Dollery L (C) Economics		Roy Powell				DB	John Baldry L (C) Economics		Roy Powell
5:00- 6:00pm			DB		DB					DB		DB
6:00- 7:00pm			2 megabytes						384 Kilobytes			
7:00- 8:00pm			PSYCH 329 G Noble EXTERNAL STUDENTS	ENG 100 T Nelson				HIST 155 M Starnes	EXTERNAL STUDENTS			
8:00- 9:00pm			GEOG 100 J Walmsley	SOC 101 P Lurich								
VISITORS			NSW TAFE pm sessions	CSU OAC	NDEC/CSU OAC/NSW Tafe			CSU HUNTER	HUNTER			

There will be 15 min daily operations debriefing at the cessation of the daytime transmission.
DB

T = Tutorial L = Lecture B= Belshaw Lecture Theatre Economics Faculty (250+ students) C = Deans Conference Room Economics Faculty a = 5/6 students

APPENDIX B

EVALUATION OF THE INTERACTIVE VIDEO TRIAL

Your name_____The subject_____Day/Time_____

Please give your opinion about each of the following aspects of this session. (Circle the number which comes closest to your opinion)

ABOUT PHYSICAL PRESENTATION

The quality of the picture was:

Excellent		Fair		Poor
1	2	3	4	5

The quality of the sound was:

Excellent		Fair		Poor
1	2	3	4	5

My view of the screen was:

Excellent		Fair		Poor
1	2	3	4	5

ABOUT INSTRUCTIONAL PRESENTATION AND COMMUNICATION

Presentation of the subject matter was:

Too fast		About right		Too slow
1	2	3	4	5

Very clear		Fairly clear		Not clear
1	2	3	4	5

Instructional aids (for example, a whiteboard or overhead projector) were:

Very clear		Fairly clear		Not clear
1	2	3	4	5

Very helpful		Fairly helpful		Not helpful
1	2	3	4	5

Was there sufficient opportunity for questions?

Yes		Sometimes		No
1	2	3	4	5

Was there sufficient opportunity for discussion?

Yes		Sometimes		No
1	2	3	4	5

Please turn over

OVERALL COMMENTS ABOUT THE SESSION

In general, was this session useful?

Definitely		Moderately		Not at all
1	2	3	4	5

In general, was this session enjoyable?

Definitely		Moderately		Not at all
1	2	3	4	5

Compared to a normal face-to-face lecture or tutorial, how much do you think you learned from this session?

More		About the same		Not as much
1	2	3	4	5

Please note below any one or two things about this interactive video session which you thought were *particularly good.*

_____

_____

_____

_____

Please note below any one or two things about this interactive video session which you feel *should be changed or improved* (please give your reasons).

_____

_____

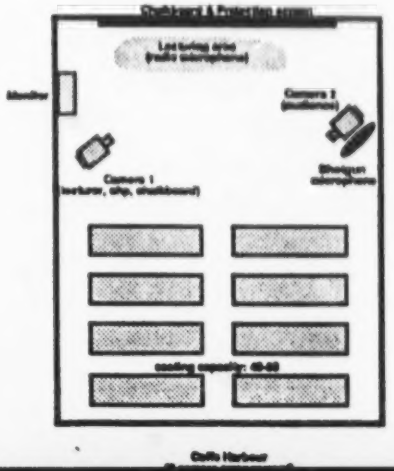
_____

_____

SO FAR, how do you feel about the *general usefulness* of having classes which use interactive video.

Very useful	Fairly useful	Not very useful	I'm not sure yet
1	2	3	4

On the diagram, please indicate with a cross the approximate position where you were sitting.



EVALUATION OF THE INTERACTIVE VIDEO TRIAL

This comment sheet asks about your reactions to tonight's interactive video session. Your opinions would be most helpful to the University in its evaluation of possible uses of this technology.

Tonight's course?_____

Please give your opinion about each of the following aspects of this session. (Circle the number which comes closest to your opinion)

ABOUT PHYSICAL PRESENTATION

The quality of the picture was:

Excellent		Fair		Poor
1	2	3	4	5

The quality of the sound was:

Excellent		Fair		Poor
1	2	3	4	5

My view of the screen was:

Excellent		Fair		Poor
1	2	3	4	5

ABOUT INSTRUCTIONAL PRESENTATION AND COMMUNICATION

Presentation of the subject matter was:

Too fast		About right		Too slow
1	2	3	4	5

Very clear		Fairly clear		Not clear
1	2	3	4	5

Instructional aids (for example, a whiteboard or overhead projector) were:

Very clear		Fairly clear		Not clear
1	2	3	4	5

Very helpful		Fairly helpful		Not helpful
1	2	3	4	5

Was there sufficient opportunity for questions?

Yes		Sometimes		No
1	2	3	4	5

Was there sufficient opportunity for discussion?

Yes		Sometimes		No
1	2	3	4	5

Please turn over

Please note below any one or two things about this interactive video session which you thought were *particularly good.*

Please note below any one or two things about this interactive video session which you feel *should be changed or improved* (please give your reasons).

Apart from the purposes for which the technology was used tonight, are there other kinds of uses which you feel would be valuable? For example, do you think this technology might supplement or replace weekend schools and/or residential schools. Please comment as fully as possible.

If you were to allocate priorities in how this interactive technology might be used, what do you consider should be the *major priority areas.*

Overall, how do you feel about the *potential usefulness* of interactive video technology for external studies programs.

Very useful	Fairly useful	Not very useful	I'm not sure yet
1	2	3	4

EVALUATION OF THE INTERACTIVE VIDEO TRIAL

Staff Comment Sheet

Name:_____

Day and Time of Session_____

ABOUT THIS SESSION

Taken overall, how satisfied were you with:

The quality of the picture from Coffs Harbour?

Very satisfied		Fairly satisfied		Not satisfied
1	2	3	4	5

The quality of the sound?

Very satisfied		Fairly satisfied		Not satisfied
1	2	3	4	5

Using instructional aids (overhead, whiteboard etc.)

Very satisfied		Fairly satisfied		Not satisfied
1	2	3	4	5

The possibility for students to comment or ask questions?

Very satisfied		Fairly satisfied		Not satisfied
1	2	3	4	5

The pacing of the session?

Very satisfied		Fairly satisfied		Not satisfied
1	2	3	4	5

Your level of personal comfort?

Very satisfied		Fairly satisfied		Not satisfied
1	2	3	4	5

[For the open ended questions below, please write on the back of the sheet if you need more space.]

Compared with a normal face to face session, how effective do you feel this session has been? Please give your reasons.

_____

_____

_____

_____

Compared with a normal face to face session, did you have to make modifications in how you prepared and delivered this session? If so, please describe.

Were there any factors (technical or in terms of your comfort or presentation) which you feel would have made this session *more effective*? If so, please note these below.

Were there any factors which you feel made this session *less effective* than it might have been? If so, please note these below.

CONSIDERATIONS FOR THE FUTURE

If this interactive video technology becomes more widely used, it will be desirable to have orientation or training sessions for staff. Are there any points or suggestions regarding possible orientation or training programs which you might wish to note at this stage?

Do you have any other comments or suggestions about future procedures or changes if interactive video technology is to be more widely used by the University.

STAFF COMMENTS ABOUT FUTURE PROCEDURES OR CHANGES IF INTERACTIVE VIDEO TECHNOLOGY WERE TO BE MORE WIDELY USED BY THE UNIVERSITY. 30

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